INAF ACTIVITIES @ OPENPOWER FOUNDATION

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OPENPOWER

INAF
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OPENPOWER FOUNDATION

- **INAF** becomes a member of the **OpenPOWER Foundation** in 2015 (Academic member)
- The OpenPOWER Foundation was founded in 2013 as an open technical membership organization around the **CPU Power and related technologies, until data centers**.
- The Foundation proposes a **collaborative** model that goes beyond the simple producer-customer relationship: both hardware technology and related software (based on Linux) are "**open**".
  - This allows new manufacturers to deliver Power products without depends on IBM.

- Open hardware (many vendors)
- Open source (linux)
- The format is a 'foundation', a place where is possible to discuss with developers

MEMBERSHIP LEVELS

Membership Level	Annual Fee*	FTEs	Technical Steering Committee	Board/Voting Position
Platinum	$100k	10	One seat per member not otherwise represented	Includes Board position, includes TSC position
Gold	$60k	3	May be on TSC if Work Group lead	Gold members may elect up to one BOD member per three Gold members
Silver	$20k ($5k if <300 employees) ($0 if ISV community <300 employees)	0	May be on TSC if Work Group lead	One board seat elected by all Silver members
Associate and Academic	$0	0	May be on TSC if Work Group lead	May be elected to one community observer, non-voting Board seat


Implementation / HPC / Research
Software
System / Integration
I/O / Storage / Acceleration
Boards / Systems
Chip / SOC
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OPENPOWER @ INAF

- Web site and mailing list: openpower@inaf.it
  - http://www.ict.inaf.it/twiki/bin/view/OpenPOWER/WebHome
- The **OpenPOWER workgroup for Physical Science**
  - Member of the Technical Steering Committee
- **You can register yourself at https://openpowerfoundation.org and follow the work of the working groups.**

TECHNICAL STEERING COMMITTEE RESPONSIBILITIES

- **Recommending** the charter of **new Work Groups** to the Board; including scope of work and confidentiality level;
- **Resolving technical conflicts** within and between Work Groups;
- Evaluating requests for **inter-project collaboration** and recommending the chartering of new Work Groups to facilitate such collaboration;
- **Monitoring the technical progress of Work groups**;
- **Approving OpenPOWER Standards Final Deliverables**;
- Establishing OpenPOWER Standards Final Deliverable quality standards, technical best practices and release dates;
- Approving changes by Work Groups to OSS Communities and OSS Licenses in the Work Group's charter, and under section 3.5 of the Intellectual Property Rights Policy;
- Regularly reporting on progress of Work Groups to the Board.

OPENPOWER FOUNDATION WORKGROUP FOR PHYSICAL SCIENCE

PHYSICAL SCIENCE WORKGROUP @ OPENPOWER FOUNDATION

The workgroup aims at addressing the challenges of Physical Science projects.

Physical Science WG: a **forum** of 'scientists' and '(technological) developers' at the same level around a technological solution **(Power architecture and Linux)**.

Why a focused effort on Physical Science?

Feasibility of current and future scientific projects.

Challenging requirements

Understand the direction of the technology

- Participation mode: **public**
- **Not confidential**

Identification of specific use cases of Physical Science Projects. the workflow and related requirements.

Identification of commonalities between different projects

PROJECTS

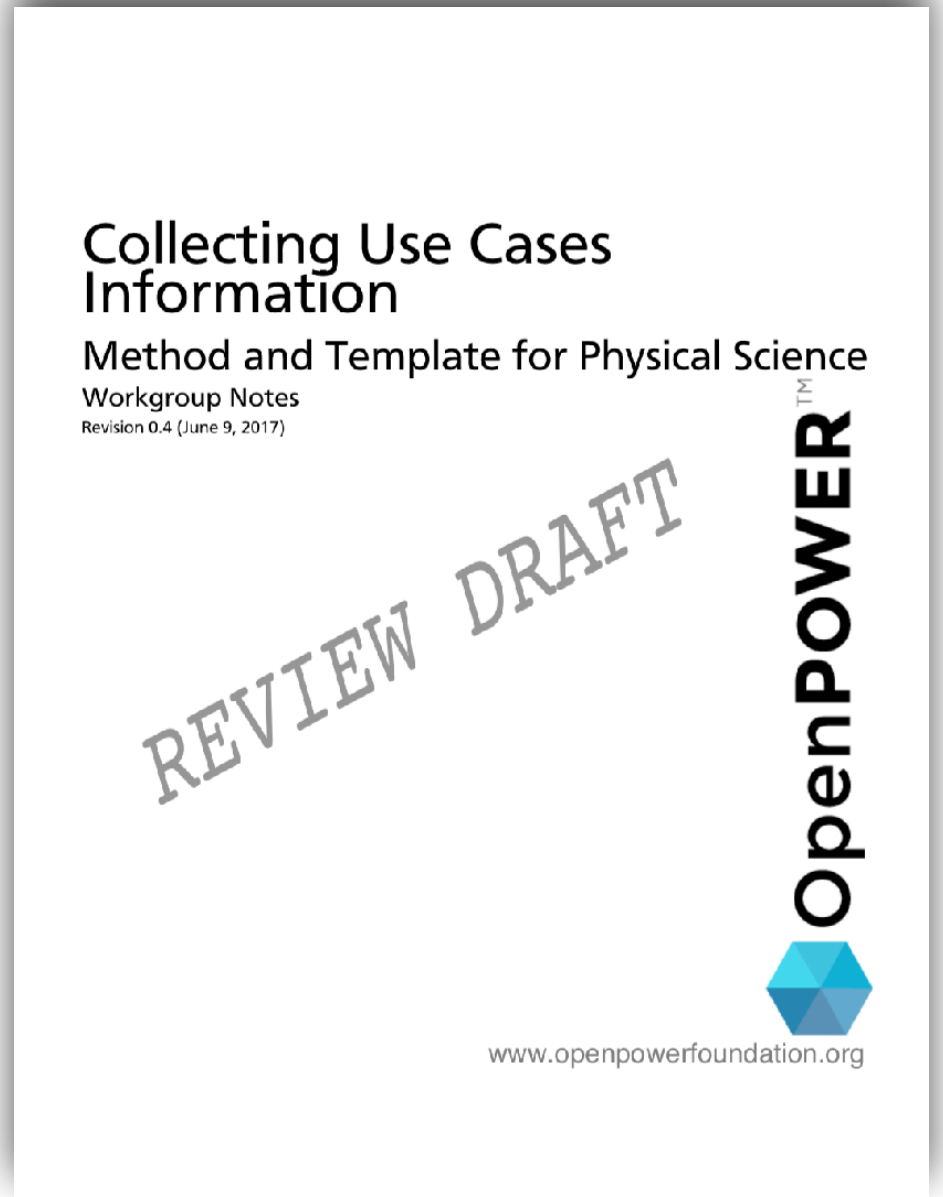
- (1) **Current and future Physical Science projects use cases, requirements, common workflows and reference solutions.** Collection of use cases and related requirements. Based on these requirements, identification of common workflows and possible reference solutions in collaboration with other OPF WGs.
- (2) **Scientific software frameworks and libraries.** Identification of widely used software frameworks and libraries used in the Physical Science (based on the experience of WG members), status of the porting to OpenPOWER solutions. Based on the contribution of WG members, execution of performance tests. Usage of proprietary software already developed or available in participating scientific groups.

DELIVERABLES

- **WP1 (method)**. The writing of a Note on **methodologies for describing use cases**, to document use cases in a way useful for people that are not an expert in the domain area of the Physical Science projects. This help to link the activities of this WG to those of other WGs and to manage in an effective way the requirements inception.
- **WP2 (Use Cases)**. The writing of Note(s) identifying specific **use cases of Physical Science Projects** (from Big Science projects as well as projects at laboratory level), the area (e.g. experimental or computational science), **the workflow and related requirements**. The selection of use cases will depend on the experience and availability of the WG members.
- **WP3 (Software)**. The writing of Note(s) that lists the **main available scientific software frameworks and libraries** (both proprietary and open source) for Physical Science projects, and t**he status of the porting** of them on OpenPOWER platforms. The selection of framework and libraries will depend on the experience and availability of the WG members.
- **WP4 (Solutions)**: Identification of **common workflows** and possible platforms (HW and SW) and **performance tests**

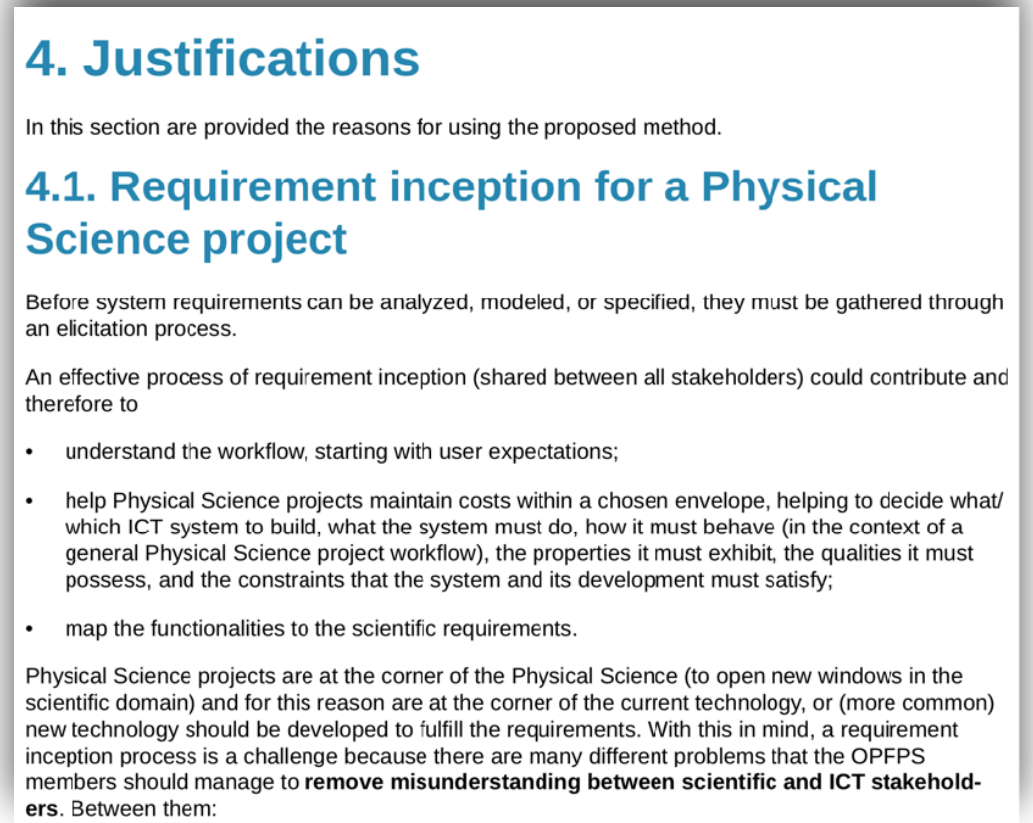
FIRST NOTE

- The main purpose of this Note is to **define a method and a template to collect Physical Science use cases from scientists and research engineers working on Physical Science projects** in the context and within the scope of the OpenPOWER Foundation for Physical Science Workgroup.
- An effective method (shared between all stakeholders) could contribute to
  - **understand the workflow**
    - help Physical Science projects maintain costs within a chosen envelope;
  - starting with **user expectations**
    - map the functionalities to the **scientific requirements**;
  - remove possible **misunderstanding** between the scientific community and ICT stakeholders.



FIRST NOTE/2

- The stakeholders are:
  - physical Science community: stakeholders that are actively involved in the scientific project, are affected by its outcome or can influence its outcome, and that should provide requirements:
    – scientists;
    – research engineers.
  - ICT community: stakeholders that could provide a solution;
  - WG participants: members of both communities that should provide support for collecting, analyzing and categorizing requirements.



4. Justifications

In this section are provided the reasons for using the proposed method.

4.1. Requirement inception for a Physical Science project

Before system requirements can be analyzed, modeled, or specified, they must be gathered through an elicitation process.

An effective process of requirement inception (shared between all stakeholders) could contribute and therefore to

- understand the workflow, starting with user expectations;
- help Physical Science projects maintain costs within a chosen envelope, helping to decide what/which ICT system to build, what the system must do, how it must behave (in the context of a general Physical Science project workflow), the properties it must exhibit, the qualities it must possess, and the constraints that the system and its development must satisfy;
- map the functionalities to the scientific requirements.

Physical Science projects are at the corner of the Physical Science (to open new windows in the scientific domain) and for this reason are at the corner of the current technology, or (more common) new technology should be developed to fulfill the requirements. With this in mind, a requirement inception process is a challenge because there are many different problems that the OPFPS members should manage to **remove misunderstanding between scientific and ICT stakeholders**. Between them:

METHOD: STEP 1

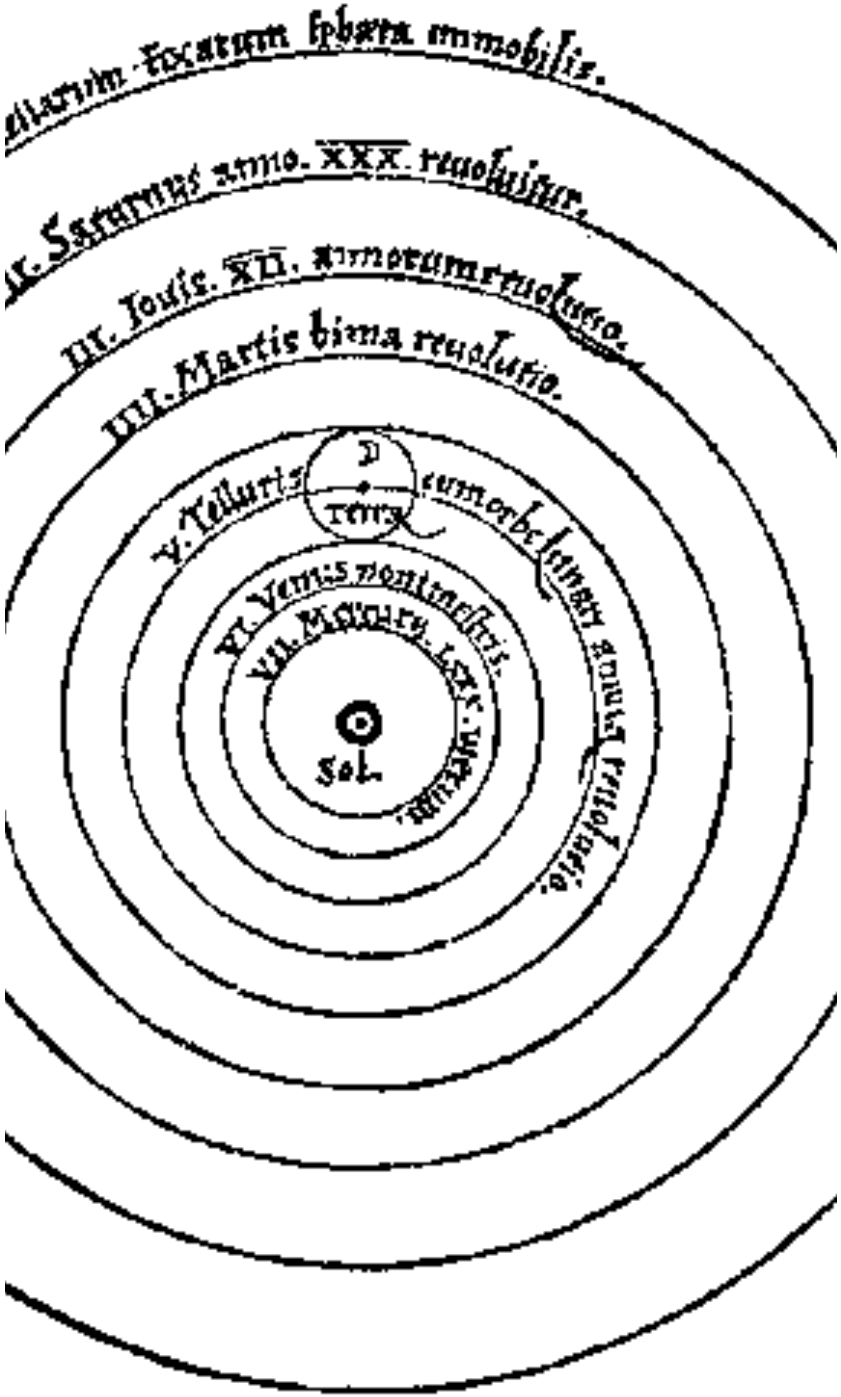
- **Description of the scientific problem and related scientific requirements.** In this context, the WG asks scientific stakeholders to provide an overview/**summary of their problem** (with a short description of the scientific objectives), and to **provide scientific requirements**;

Scientific problem analysis	
Name of the **scientific project**	
Scientific **objectives**	Write some short statements about the objectives of the scientific project for which the scientific stakeholders want to resolve a problem. This section is useful to put the scientific project under analysis in the general context. Define objectives, not requirements.
Scientific requirements and problem definition	Write a **scientific problem statement**. The statement should include: • What is the problem for the scientific project? • Who is affected by it? • What is the impact of this problem on the scientific project? Identify here the **scientific requirements** that the solution can contribute to fulfill. The scientific requirements should be **measurable.** *The problem of …* *affects …* *and results in … (list scientific requirements that are not fulfilled/ that is too expensive to fulfill/ that must be fulfilled)*
Known **challenging** and **risks**	Sometimes there are challenges and risks behind the problem. It could be important to find factors that may not be immediately apparent for an external stakeholder.

METHOD: STEP 2

➤Definition of use cases and identification of system requirements that are used as input to define a solution.

System requirements of the solution (a product/hardware-software solution)	
Outline of the **scope**	Define solution system boundaries, e.g. with a context diagram or in a textual form. Details are in the following sections of the table.
Benefits of a **solution**	The resolution of these problems is also the resolution of scientific requirements, i.e. the increasing of real value for the scientific community. This contributes to define new measurable to compare different solutions. Some questions: • Is there a proposed or a current (in-operation) solution? • Why the current (if exists)/proposed solution is it not profitable? Poor design? Too expensive? • What are key benefits to find a new solution for this problem? Example. *The current solution is... (if present). Benefits of a solution/new solution that create a new system to address the problem include: ... The solution could have a direct impact on the following scientific requirements: ...*
Available technologies of the context	List currently available technologies used in the context of the considered scientific problem.
Assumptions	Assumptions made
Description of the **workflow**/main functional and non-functional **requirements**	It is possible to describe the solution in term of a workflow, a list of functional requirement (list the major features or user capabilities unique to the product) or a use case and a list of non-functional requirements. This Note does not specify "how to" write requirements. **Guidelines:** it is important to define problems parametric as some performance targets, to help to understand how different performance requirements scale. The final solution (hardware and software) depends on storage needs, computing power, and programming techniques. Some questions are provided, but feel free to add any information that you think is important:



CONCLUSIONS

- Workgroup: the purpose is to **focus OPF members on "Physical Science" use cases**
  - first deliverable: done
  - We need to collect USE CASES
- Activities on Power system are ongoing
  - porting of geantV library with CERN (master thesis)
- An agreement between IBM and INAF is under discussion

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“Thank you”

-Andrea Bulgarelli